

Answering the Call: A Response to Roblyer and Knezek

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First, I'd like to express my gratitude for the opportunity to respond to the Roblyer and Knezek article. I believe that it raises some critical issues about formulating a much-needed research agenda for educational technology and I appreciate being part of the conversation.

Let me begin with the authors' assessment of current educational technology research—that it tends to lack sufficient theory, fails to provide adequate evidence about how modern technologies enhance achievement and motivation, and fails to adequately shape practice in the field. That's a strong statement, but unfortunately, I tend to agree. I do appreciate, though, the positive manner in which these issues were framed, focusing on the challenges and opportunities that we face. It should be noted that designing and implementing technology-based learning activities in schools can be likened to learning to fly an airplane while it is being built. Furthermore, if you factor in the numerous competing agendas for school reform it is not surprising that the research agenda for educational technology is not particularly focused. Considering the progress that's been made in the field in a very brief amount of time, we should not be overly critical of our shortcomings. With that said, though, I agree with the authors that as our field matures, and as external pressures mount, it makes sense to formulate a more focused research agenda that will better inform practice in our schools.

The historical perspective that Roblyer and Knezek provide is very helpful for informing where we currently are as well as where we should be going. Although I tend to agree with Clark (1983, 1985, 1991, 1994, as cited in Roblyer & Knezek, 2003) in his criticism of media comparison studies as they were conducted, I accept Roblyer and Knezek's premise that the goals of such research should be revisited. Perhaps part of the problem has been the proliferation of many small-scale studies that failed to acknowledge the range of variables involved in technology-based learning, and in effect, resulted in overly simplistic comparison of media. I agree with Kozma's (1994) conclusions, published in a special issue on the topic, that we need to conduct research on "what ways can we use the capabilities of media to influence learning for particular students, tasks, and situations" (p. 18). That fits nicely with Roblyer and Knezek's premise that we should "look at technologies not as delivery systems, but as components of solutions to educational problems" (p. 65).

As the authors suggest, it makes sense to reach "some détente in the theory debates" (p. 64) and to proceed with an agenda that helps inform what works in actual instructional settings. Furthermore, it is reasonable to assert that technology-based methods should ultimately be able to demonstrate a "relative advantage" over other instructional methods. In this case, though, I would like to em-

phasize the word ultimately, and suggest that we investigate relative advantage in a balanced, forward-looking way. With the NCLB legislation and accompanying views of assessing student achievement, relative advantage for some could easily be reduced to quantitative measures. Although it's clear that standardized tests and other objective measures are a force to be reckoned with and should be considered and thoughtfully employed, I would challenge the research community to continue exploring the relative advantage of transformative technology applications that may not fit as readily with the status quo. It seems clear that we need a balance of research that informs "what to do on Monday" with research that may ultimately inform what we do on Monday five or ten years hence. A broad interpretation of relative advantage seems critical to accommodate interest in "established measures of education quality" as well as the transformative vision that Seymour Papert (1980) articulated with Logo two decades ago or what Alan Kay (2003) is exploring with Squeak today.

The concept of relative advantage can also be applied to particular approaches within an instructional method. For example, Bernie Dodge (2003) recently suggested five models of motivation that could inform a research agenda investigating approaches to the design and implementation of WebQuests. Although Dodge was not particularly interested in research that compares WebQuests to traditional approaches such as lectures, he did suggest that theory-based research was needed to help identify approaches within WebQuests that increase student motivation and learning.

I appreciate Roblyer and Knezek's suggestion that studies should seek to identify technology-based methods that "have the potential for unique and fairly consistent benefits in response to certain kinds of educational problems" (p. 65). Although this may be a matter of semantics, I prefer this language to the more prescriptive phrases of "best practice" and "scientifically-based evidence." For me, such phrases tend to minimize the range and importance of variations in particular educational contexts. Teaching is both an art and a science, and as we seek to inform those elements that elevate the science of teaching, we should also seek to dispel the notion that effective teaching and learning can be reduced to science alone. The authors did well to cite Berliner's notion that "good science" requires not only trying to capture valid and reliable evidence, but also attempts to account for the complex set of conditions that led to improvement.

GUIDELINES FOR DESIGN METHODS AND REPORTING

With the caveat that research topics should remain sufficiently balanced to address a range of research questions, I support Roblyer and Knezek's call for greater rigor within all approaches to research. It makes sense that research questions be stated in a way that the contributions of particular methods can be examined and tested, and that researchers seek to address the design shortcomings outlined. I agree that "they must be more comprehensive and informative about the methods and materials used, conditions under which studies take place, data sources and instruments, and subjects being studied; and they must emphasize coherence between their methods, findings, and conclusions" (p.

69). Although we clearly should refrain from simplistic comparisons of materials cited by Clark (1983, 1985, 1991, 1994, as cited in Roblyer & Knezek, 2003), I also agree that research needs to help us sort through the myriad approaches to using technology and help identify those “promising practices” that may consistently be effective in addressing particular educational needs. While qualitative studies can be particularly helpful in exploring new approaches and applications, as Berliner (2002) reminds us, good science requires detailed descriptions of the context and implementation strategies employed. Without including such descriptions in research reports, the transferability of such findings to other contexts is severely limited (Lincoln & Guba, 1985).

One goal of the proposed new millennium research agenda would be to inform decision making in terms of the allocation of funds to support technology-based methods. This, of course, is reasonable, with one important caveat. Part of effectively implementing technology in schools depends upon identifying and establishing the essential conditions to support optimal implementation. In many cases researchers have put forth conclusions about particular technology-based methods without adequately scrutinizing critical factors such as the adequacy of student access to the technology, the comfort level of the teacher, etc. I would argue that researchers must help identify the conditions necessary to realize the relative advantage of a technology-based method and avoid making premature conclusions about particular methods-based studies in which essential conditions are not in place. This supports Roblyer and Knezek’s notion that educational technology research needs to help discern fairly consistent benefits of particular technology-based methods. Without paying more attention to the necessary conditions, we will be much less likely to ascertain and document a method’s relative advantage.

For example, Hall and Hord (2001) provide a model for studying change efforts that takes into account the concerns and levels of use of the implementers, as well as how the innovation is configured when implemented. They state that a major reason widespread change is often not successful is that change implementers do not fully understand what the innovation is and what it will look like when put into practice. Furthermore, they explain, “When a variety of configurations of an innovation are implemented, there is little likelihood that significant gains in student learning will be detected across all classrooms” (p. 53). The researchers recommend creating an innovation configuration map that identifies major components of innovations and then describes observable variations for each component. Such measures fit well with the need to define what effective technology integration looks like so that we might be able to discern positive learning outcomes and the relative advantage that may result.

Providing this level of detail will enable researchers to obtain more valid and reliable data to inform policy debates and classroom practice. A look at the well-publicized debate between Larry Cuban and Hank Becker may prove useful to this discussion. As Roblyer and Knezek noted in their article, Cuban and colleagues have articulated forceful arguments questioning the benefits derived from learning technologies in schools (2001, as cited in Roblyer & Knezek, 2003). In response to Cuban’s arguments, based on his recent research, Becker wrote:

Thus, in a certain sense Cuban is correct—computers have not transformed the teaching practices of the majority of teachers, particularly teachers of secondary academic subjects. However, under the right conditions—where teachers are perfectly comfortable and at least moderately skilled in using computers themselves, where the school’s daily class schedule permits allocating time for students to use computers as part of class assignments, where enough equipment is available and convenient to permit computer activities to flow seamlessly alongside other learning tasks, and where teachers’ personal philosophies support a student-centered constructivist pedagogy that incorporates collaborative projects defined partly by student interest—computers are clearly becoming a valuable and well-functioning instructional tool (2000, p. 29).

I think Becker’s statement nicely illustrates the nature and complexity of educational change with technology and points to the challenges that await researchers in the field. For those of us who have experienced the magic of teaching and learning with technology and “know” of its benefits, it is incumbent upon us to document those approaches to inform policy and classroom practice. Toward that end, I applaud Roblyer and Knezek’s efforts to lay out some critical issues and put forth an agenda that will help us accomplish these goals. Clearly, there is much work to be done!

Contributor

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References

- Becker, H. J. (2000). *Findings from the teaching, learning, and computer survey: Is Larry Cuban right?* Available: www.crito.uci.edu/tlc/findings/ccsso.pdf
- Berliner, D. (2002). Educational research: The hardest science of all. *Educational Researcher*, 31(8), 18–20.
- Dodge, B. J. (2003, March). *Motivational aspects of WebQuests*. Paper presented at the conference of the Society for Technology and Teacher Education, Albuquerque, NM. pp. 1737–1739.
- Hall, G. E., & Hord, S. M. (2001). *Implementing change: Pattern, principles, and potholes*. Needham Heights, MA: Allyn & Bacon.
- Kay, A. (2003, June). *How children will finally invent personal computing*. Presented at the National Educational Computing Conference, Seattle, WA.

- Kozma, R. B. (1994). Will media influence learning? Reframing the debate. *Educational Technology Research and Development, 42*(2), 7–19.
- Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.
- Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas*. New York: Basic Books.
- Roblyer, M. D., & Knezek, G. (2003). New millennium research for educational technology: A call for a national research agenda. *Journal of Research on Technology in Education, 36*(1), 61–72.